# NATURAL RESOURCES CONSERVATION SERVICE

# CONSERVATION PRACTICE STANDARD

## Regulating Water in Drainage Systems

**(Acre)**

**Code 554**

### DEFINITION

Controlling the removal of surface or subsurface runoff, primarily through the operation of water control structures.

### PURPOSES

To conserve surface or subsurface water by controlling the outflow from drainage systems to maintain optimum soil moisture conditions. Such conservation of water will make it possible to:

1. Establish and encourage the growth of desired field or forest plants.

2. Reduce subsidence and wind erosion of organic soils, and

3. Hold water in channels in forest areas to act as ground firebreaks and provide drinking water for wildlife and a resting and feeding place for waterfowl.

### CONDITIONS WHERE PRACTICE APPLIES

This practice applies to areas where drainage is needed during certain periods and where it is advantageous to limit the outflow or pumping rate at other times. This practice is especially applicable in organic soils and in highly permeable soils of low available water capacity.

### CRITERIA

The water management system must have the depth, spacing and capacity to provide the necessary drainage relief for the plants when controls are open. Control of outflow shall be by structures or pumps capable of removing the design flow and/or regulating water stages in the drainage system. The outflow controls shall be related to the amount of water available and the degree of control necessary for soil and plant requirements.

The design of related water management practices will need to be coordinated with this practice for it to achieve its intended purpose.

For crops that are highly sensitive to excessive and inadequate soil water conditions, the field surfaces must be smooth, and the distance between the soil water level and the ground surface must be as uniform as practical. Fields shall be smoothed or graded, as required, to achieve this uniformity. Structures and pumps shall be located where they are accessible and subject to convenient control.

### CONSIDERATIONS

Regulating water in drainage systems should be part of the treatment needed to protect the soil, water, plant, animal and air resources. The management system must be planned to prevent excessive maintenance and operation problems.

Effects of water quantity and quality shall be considered. This practice controls the removal

and retention of surface or subsurface water through the operation of water control structures. Water quantity effects may vary with the conservation treatment needs and the environmental conditions of the site. Any of the components of the water budget may be affected depending on the methods of water control. This practice, when applied to maximize the growth of desired plants, should increase transpiration.

Outflows of water from the system must be controlled to prevent erosion and sedimentation damage to downstream areas. Movement of dissolved chemicals and nitrates must be considered in selecting disposal methods to prevent environmental damage. Due to the retention of the water, there is an increased opportunity for dissolved chemicals and nitrates to be leached toward the ground water and eliminated from downstream waters. Downstream water temperatures may be changed by the discharge. If waters are stored in open channels, the water temperature may be increased during the summer months. If the released waters are from subsurface sources, downstream water temperatures may decrease from the release of cooler waters. Denitrification may occur in treated areas which may reduce nitrate loading to receiving waters.

Water Quantity

1. Effects of water budget variations on the water supply either above or below the point of control.

2. Effects of changes in the flow of downstream water courses.

Water Quality

1. Effects of outflow on erosion in downstream water courses.

2. Effects of possible changes in the yields of sediment and sediment-attached substances.

3. Potential for changes in dissolved chemical loading from nitrates and other salts including managing denitrification.

4. Salinity of soils and of ground and surface waters.

5. Effects on downstream temperatures.

6. Effects of the planned drainage outflow on the visual quality of discharge or downstream water.

Special attention shall be given to maintaining and improving visual resources and habitat for fish and wildlife where applicable. The landowner/user shall be advised if wetlands will be affected and USDA-NRCS wetland policy will apply. All work planned shall be in compliance with General Manual Title 450-GM, Part 405, Subpart A, Compliance with Federal, State, and Local Laws and Regulations. If archaeological and historical properties are encountered, the USDA-NRCS policy in General Manual Title 420-GM, Part 401, shall be followed.

**PLANS AND SPECIFICATIONS**

Plans and specifications for regulating water in drainage systems shall be in keeping with this standard and shall describe the requirements of properly installing and operating the practice to achieve its intended purpose.

**OPERATION AND MAINTENANCE**

A plan of operation shall be prepared for the system that will insure that the objectives are met. The plan of operation shall include such information as time and stage to hold water in ditches, pumping schedules, and coordination of water management operations in the system with rainfall, season and crop and soil moisture needs.